

Europäische Patentamt  
European Patent Office  
Office européen des brevets



(11) **EP 0 754 416 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:  
**22.01.1997 Bulletin 1997/04**

(51) Int Cl.<sup>6</sup>: **A44B 18/00, C09J 7/04**

(21) Application number: **96305293.1**

(22) Date of filing: **19.07.1996**

(84) Designated Contracting States:  
**DE ES FR GB IT**

• **Kato, Hisanori**  
**60488 Frankfurt (DE)**

(30) Priority: **21.07.1995 GB 9514987**

(74) Representative:  
**Luckhurst, Anthony Henry William**  
**MARKS & CLERK,**  
**57-60 Lincoln's Inn Fields**  
**London WC2A 3LS (GB)**

(71) Applicant: **YKK Europe Limited**  
**London EC1V 8AN (GB)**

(72) Inventors:  
• **Steinmetz, Klaus**  
**58553 Halver (DE)**

(54) **Self-adhesive fastener**

(57) A self-adhesive part for a hook and loop fastener has a coating of pressure-sensitive adhesive applied to the back face of the base material, for adhering the

part to a substrate. The adhesive is water based and is applied as a plurality of coats, and dried between successive coats. This reduces the overall drying time without impairing performance.

**EP 0 754 416 A1**

## Description

The present invention relates to a self-adhesive surface fastener, and in particular to a hook and loop fastener, in which at least one of the parts has a pressure-sensitive adhesive coating on the base material for adhering the part to a substrate.

Existing hook and loop fasteners of this type use a hot melt adhesive. The hot melt adhesives are adversely affected by temperature variations and/or do not provide sufficient strength in some applications.

Organic solvent based adhesives pose environmental problems.

Thus, water based adhesives, as a solution or dispersion, are preferred because they are environmentally friendly and can offer high temperature resistance, up to 160°C in some formulations.

However, the advantages of the water based adhesives are offset by the production difficulties.

Typically, a surface fastener part is manufactured as a long roll. In the case of a hook and loop fastener, the hooks or loops, or mixed hooks and loops, are formed on a flexible polymer base material, as is well known in the art. If an aqueous based adhesive is applied to the back of the base material in a continuous process, the coated material must be run through a long path to give the adhesive sufficient time to dry. Attempts at speeding up the drying process impair the performance of the adhesive.

We have now realised that the water based adhesive can be applied in a plurality of layers to build up to the required layer thickness.

Thus, the present invention provides a method of manufacturing a self-adhesive part of a surface fastener, the part having a base material, and an adhesive coating being applied to the back of the base material, wherein the adhesive is a water based adhesive and is applied in a plurality of layers, and the adhesive is dried between the application of the successive layers.

Very preferably, the surface fastener is a hook and loop fastener.

Preferably, the adhesive is applied in three or more layers.

Unexpectedly, it has been found that the required overall drying time is reduced when the adhesive is applied in a plurality of layers, there is no adverse effect on the bonding of the adhesive to the base material, and the performance of the adhesive layer is not impaired.

The invention also provides an apparatus for applying a water based adhesive to a base material of a part of a surface fastener, the apparatus comprising,

a first coating station for applying a first layer of the adhesive to the back of the base material,  
a first drying station for drying the adhesive,  
a second coating station for applying a second layer of adhesive over the first, dried layer, and  
a second drying station for drying the second layer.

Preferably a third coating station and a third drying station are provided.

Very preferably, the surface fastener is a hook and loop fastener.

Although the apparatus of the invention has a plurality of coating stations and drying stations, the apparatus can be substantially shorter than an apparatus which has only a single coating station for applying and then drying the adhesive layer in a single coat.

The invention also provides a self-adhesive part for a surface fastener, the part comprising a base material having fastener elements provided on one side and a pressure sensitive adhesive applied to the other side, wherein the adhesive is water based and has been applied in a plurality of layers. Preferably, the fastener elements are hooks and/or loops of a hook and loop fastener.

The invention will be further described by way of example with reference to the accompanying drawings, in which,

Figures 1a and 1b show respective parts of a hook and loop fastener forming an embodiment of the invention,

Figure 2 shows an apparatus forming an embodiment of the invention.

Figures 1a and 1b, which are not to scale, respectively show the hook part 2 and loop part 4 of a hook and loop fastener.

The parts 2, 4 are formed as a continuous strip of material which can be cut to the required size and shape.

The base material 6, 8 depends on the particular application for the fastener and method of manufacture, as is well known in the art.

A typical hook part 2 comprises a flexible woven nylon or polypropylene base material 6 which is about 10 cm wide. Loops are woven into the material, and are then cut to form hooks 10. A typical loop part 4 has textile base material 8 with a loop pile 12. The base material may also be knitted.

As will be described more fully below, the back side 13 of the base material 6, 8 has a layer 14 of water based contact adhesive which is applied in a plurality of thin coats preferably three. A silicone paper 16 overlays the adhesive layer 14 to protect the adhesive layer 14 until the point of use.

Referring to Figure 2, a continuous strip 20 of hook or loop part is fed by rollers 24 from a large roll 22 into buffer containers 26. The strip 20 is fed via tensioning or take-up rollers 28 to a first coating station 30 which comprises a support roller 32 and a delivery nozzle for applying a thin layer of water based adhesive to the back 13 of the strip 20. The coated strip 20 is fed through a drying station 36 which may, for example, have infra red heaters for drying the water based adhesive. The strip 20 is then fed through second and third coating stations 30', 30" and drying stations 36', 36".

The coated and dried strip is then fed through a

cooling station 38 and silicone paper 16, fed from a roll 38, is laid over the adhesive layer 14 and the finished strip 20 is wound onto a storage reel 40.

Typically, the adhesive is a dispersion of copolymer adhesive in water, and such dispersions may typically have about 35% by weight of water.

A suitable water based pressure sensitive adhesive is JOWATEX (trade mark) manufactured by Lobers und Frank GmbH & Co. KG of Detmold, Germany, such as JOWATEX 763 40, 763 60 and EP 70 4398.

The thickness of the adhesive layer will depend on the base material, the adhesive and the intended use, but a thickness of 200 to 300 grams per square metre is typical, and this is applied in three coats of about 80 grams per square metre.

8. A surface fastener as claimed in claim 7, wherein the surface fastener is a hook and loop fastener.

9. A surface fastener as claimed in claim 8, wherein the base material is woven or knitted.

### Claims

1. A method of manufacturing a self-adhesive part for a surface, fastener, the part having a base material, and an adhesive coating being applied to the back of the base material, wherein the adhesive is a water based adhesive and is applied in a plurality of layers, and the adhesive is dried between the application of the successive layers.

2. A method as claimed in claim 1, wherein the adhesive is applied in at least three layers.

3. A method as claimed in claim 2, wherein the base material is woven or knitted.

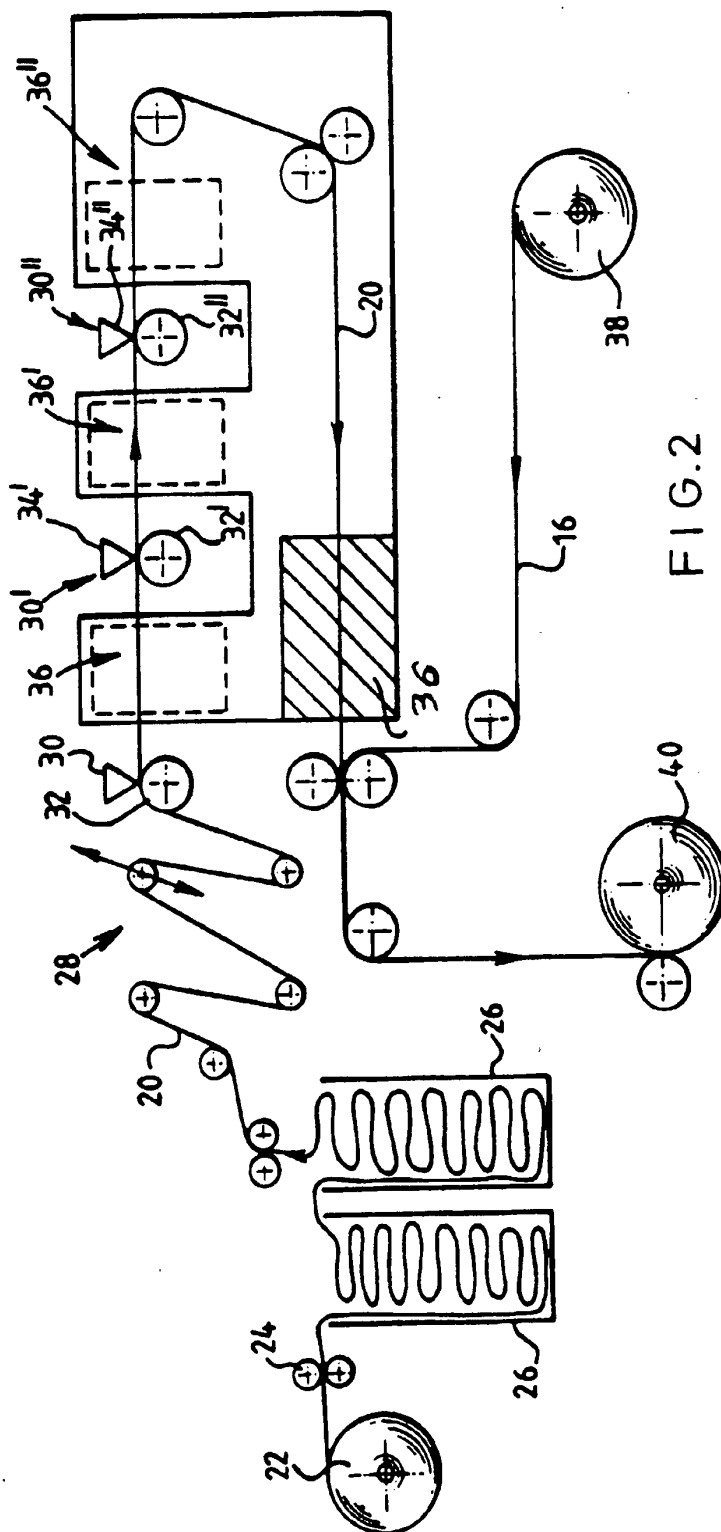
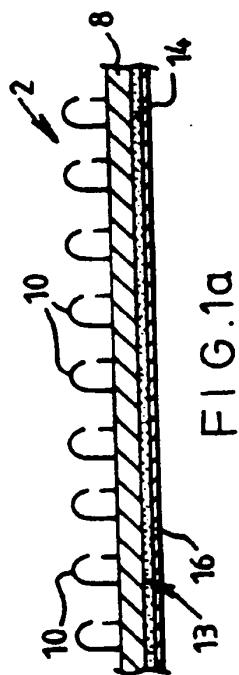
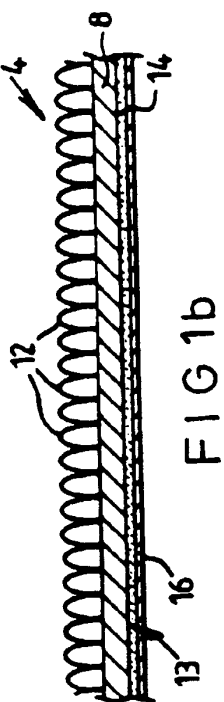
4. A method as claimed in claim 1, 2 or 3, wherein the surface fastener is a hook and loop fastener.

5. An apparatus for applying a water based adhesive to a base material of a part of a surface fastener, the apparatus comprising,

a first coating station for applying a first layer of the adhesive to the back of the base material, a first drying station for drying the adhesive, a second coating station for applying a second layer of adhesive over the first, dried layer, and a second drying station for drying the second layer.

6. Apparatus as claimed in claim 4, wherein a third coating station and a third drying station are provided.

7. A self-adhesive part for a surface fastener, the part comprising a base material having hooks or loops formed on one side and a pressure sensitive adhesive applied to the other side, wherein the adhesive is water based and has been applied in a plurality of layers.





European Patent  
Office

## EUROPEAN SEARCH REPORT

Application Number  
EP 96 30 5293

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	FR-A-2 199 954 (KANEBO LTD) * page 3, line 3 - page 9, line 36 * ---	1,7-9	A44B18/00 C09J7/04
A	GB-A-1 438 721 (KANEBO LIMITED) * claims 1-8; figures 1,2 * ---	1,7-9	
A	US-A-4 624 116 (MILLIKEN RESEARCH CORPORATION) * the whole document * -----	7-9	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			A44B C09J
The present search report has been drawn up for all claims:			
Place of search THE HAGUE		Date of completion of the search 31 October 1996	Examiner Garnier, F
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application I : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 03.92 (P4/C01)

**THIS PAGE BLANK (USPTO)**